From Red Bluff to Tehama the Sacramento River, while much below the normal stage, averaged slightly above the low-water stages that prevailed during the corresponding month in 1908–1910. South of Tehama the Sacramento was the lowest ever recorded.

At Colusa the average stage, 0.9 of a foot, was 1.2 feet below the August normal and 0.2 of a foot below the previous lowest average. The average at Knights Landing was 0.8 of a foot below the zero of the gage, 2.1 feet below the normal, and nearly 1 foot lower than the previous lowest average for any month. At Sacramento City the river averaged 4.7 feet, which is 2.9 feet below the usual August stage and 0.8 of a foot below any previous monthly average. The extreme low-water stage at Sacramento during the month was 4.1 feet, which is 1 foot lower than any previous low-water record.

The influence of the tides was felt for some distance above the mouth of the American River, and at Sacramento City it amounted to as much as 1.1 feet.

In the lower reaches of the river there was little departure from the usual August stages.

Numerous sandbars formed between the mouth of the American River and Vernon, resulting in frequent interruptions to navigation and grounding among the upriver craft.

In all streams tributary to the Sacramento, especially in the Feather, Yuba, and American Rivers, the water was the lowest ever known. At Oroville on the Feather and Marysville on the Yuba the river averaged 0.4 of a foot below all previous low-water averages.

Lower San Joaquin watershed.—In the tributaries of this watershed there was little or no departure from the stages usually maintained during the month of August, and in no case were any of the feeders of the trunk stream as low as during the corresponding month in the past three years. In the San Joaquin itself, however, especially between the mouth of the Stanislaus and that of the Calaveras, the river averaged about 3 feet below the August normal stage.

NOTES ON STREAMS AND WEATHER OF THE UPPER SAN JOAQUIN WATERSHED.

By W. E. BONNETT, Local Forecaster.

Daily gage readings at the several river stations in this district show a low but remarkably uniform stage in all of the streams. In the Merced at Merced Falls and at Firebaugh on the San Joaquin the range between lowest and highest stages was but 0.2 foot and at Piedra on Kings River 0.5 foot, showing a more uniform flow than for any other August of the six covered by the record.

Average stages in the Merced were much lower in August, 1908 and 1910, and in 1909 the average was the same as that for this month, namely, 0.3 foot. At Friant the average stage was lower only in 1910, the respective stages for 1910 and 1912 being −1.1 and −0.2 feet. In the Kings River the shortage of irrigation water has been particularly grave. Holders of second-class water rights were compelled to discontinue the use of water by the middle of July, and by August 1 the head of water was so small that it could be supplied only by turning it alternately into the larger ditches.

The shortage of irrigation water in itself would not have been so serious, but the light rainfall of the preceding wet season had not replenished the groundwater so that sections not usually irrigated are beginning to suffer. Vines in some places are withering, and in others both fruit and vine, and late cuttings of hay will be very light.

The unusually cool weather of August was a continuation of subnormal temperature conditions which began with March. This includes practically all of the growing season to date in which the temperature for each month has been more or less below normal and in which the accumulated temperature deficiency is 414° or 2.3° per day.

Aside from making the summer a pleasant one, so far as personal comfort is concerned, the cool weather may also have been of benefit agriculturally, for with the normal heat of summer this year or the abnormal heat that comes in some years, the effects of drought would have been greatly intensified.

NOTE ON FORMATION OF A CLOUD DURING FOREST FIRE.

By FORD H. CARPENTER, Local Forecaster.

On August 23, at 3.48 p. m., a brush fire in the northern foothills sent up a straight column of smoke. When the fire reached its maximum intensity a small but well-developed cumulus cloud was seen to cap the ascending column. When the smoke column disappeared the cloud lasted two or three minutes. It was an interesting instance of cumulus cloud formed by ascending currents. The sky was free from cloud all day except for this solitary cumulus, which had an existence of less than five minutes.